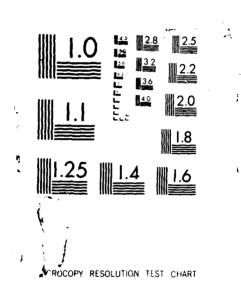
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Hydroxide Ion Conductors as Possible Electrolytes in Intermediate Temperature Fuel Cells

by

Lie-Yea Cheng, Steven Crouch-Baker and Robert A. Huggins

Extended Abstract for a Paper to Be Presented at the 172th Meeting of the Electrochemical Society
Honolulu, October 1987

Stanford University
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Hydroxide Ion Conductors as Possible Electrolytes in Intermediate Temperature Fuel Cells

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The AC ionic conductivity and thermal behavior of a material of nominal composition Li₅AlO₄ have been studied previously [1-3]. A large, sudden increase in the ionic conductivity of "Li₅AlO₄" in a wet environment at approximately 450° C was observed. Such behavior was not observed in a dry environment. Pure LiOH was found to exhibit similar behavior, and it was suggested [2,3] that the observed conductivity increase in a wet environment is due to the formation of LiOH₆ according to the reaction

$$Li_5AlO_4 + 2H_2O = 4LiOH + LiAlO_2$$

Recently, preliminary results concerning the DC conductivity of wet "Li₅AlO₄" [4,5] were tentatively interpreted in terms of OH⁻ transport, accompanied by the electrolytic decomposition of water vapor when the cell voltage is above about 1V at 500° C.

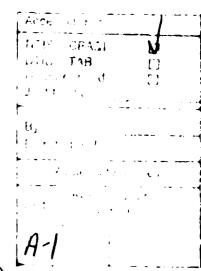
In this work, preliminary results concerning the use of compositions within the Li - Al - O - H system as possible fuel cell electrolytes at intermediate temperatures will be presented.

Acknowledgement

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